

Recent Progress of Semiconductor Optical Isolators: Physics, Devices, Applications

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Room 514, Rankine Building, Oakfield Avenue, University of Glasgow

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Abstract

Optical isolators are important devices for protecting semiconductor laser diodes (LDs) from unwanted reflected light. There is a strong demand for semiconductor waveguide optical isolators that can be monolithically integrated with LDs. We have developed semiconductor optical isolators based on semiconductor optical amplifier waveguides with ferromagnetic metals. I am going to talk about our recent progress of semiconductor optical isolators.

The talk includes:

1. The principle and physics of semiconductor optical isolators based on nonreciprocal loss and polarization rotation.
2. Monolithic integration of semiconductor optical isolators with laser diodes.
3. Application of semiconductor optical isolators. I am going to show magnetically controllable Fabry-Perot laser and an unidirectional ring laser and discuss their applications to all optical signal processing.

Biography

Hiromasa Shimizu (M'05) was born in Niigata, Japan, on Jun. 3, 1974. He received the B.S., M. S., and Ph. D., degrees in electronic engineering, from the University of Tokyo, Tokyo, Japan, in 1997, 1999, and 2002, respectively. In 2002, he joined the Research Center for Advanced Science and Technology, the University of Tokyo, as a Research Associate. Since 2007, he joined the Department of Electrical and Electronic Engineering, Tokyo University of Agriculture and Technology, as an Associate Professor. Presently, he is doing research on integratable waveguide active optical isolators and their applications to all optical signal processing.

Dr. Shimizu is a member of the Japan Society of Applied Physics (JSAP), the Institute of Electronics, Information, and Communication Engineers of Japan (IEICE), the Magnetic Society of Japan (MSJ) and IEEE Photonics Society. He received the 9th Young Scientist Award for the Presentation of an Excellent Paper at the JSAP fall meeting in 2000, the 2001 Young Scientist Award from MSJ, the Ribbon Award at 2004 Fall meeting of Material Research Society, and 2005 Japanese Journal of Applied Physics Award for the most promising young scientist.